Department of Mathematics and Statistics

Quiz No. 4

Math302,Sem121

Section: Name: ID:

Problem 1.(4 points.)Use Green's theorem to evaluate $\oint_C \bar{F}.\vec{dr}$, where $\vec{F} = 2xy\hat{i} + (e^x + x^2)\hat{j}$ and C is a piece-wise smooth positively oriented closed curve joining (0, 0), (1, 2) and (2,3).

Problem 2(4 points)Given the vector field $\vec{F}(x, y) = (sinx)y^2\hat{i} - 2y(cosx)\hat{j}$.
(i) Show that the vector field $\vec{F}$ is conservative. (ii) Find a potential function $\phi(x, y)$ whose gradient is the vector field $\vec{F}$and (iii) evaluate the integral
$I = \int_{(2,3)}^{(1,2)} (sinx)y^2dx - 2y(cosx)dy.$